

## ABSTRACT

A fermentation process is monitored by detecting ultrasound backscattered from the cells as a function of time. A transducer 46 is placed in a fermentor 30 and transmits ultrasound towards a reflecting surface 50. The transducer receives that portion of the  
5 ultrasound which reflects from the reflecting surface 50, as well as that portion of the ultrasound which backscatters from cells 34 between the transducer 46 and the reflecting surface 50. Signals from the transducer are conditioned and subsequently processed to provide output to a controller regarding the status of the fermentation process in real time. The backscattering measurements can be used to determine a growth phase  
10 transition, such as the transition between the logarithmic growth phase of the cells and their stationary phase.